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Research Article

The Role of Management Information Systems in Enhancing AI-Powered Recommendation Systems and Their Impact on Consumer Behaviour in E-Commerce

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ABSTRACT

Introduction: AI recommendations are changing the way people shop online. But how useful they are depends on how much people trust them. If shoppers believe the suggestions are good, they're more likely to buy. That's why businesses need to understand consumer trust to make AI work better for them.

Objective: The effects of trust in AI recommendation on purchasing intention and customer satisfaction.

Methods: We used a quantitative survey of e-commerce users; regressions and moderation analysis using R were used to assess how trust levels influenced consumer engagement.

Results: The study's findings indicate that consumers who moderately trust AI recommendations display the greatest engagement and purchase intent. Trust can impair AI reliance at low levels through doubt and at extremely high levels through distrust.

Conclusions: This study shows that effectiveness of AI increases when people trust it. Businesses should be open about how AI makes suggestions. They should also make recommendations more personal to keep customers engaged. When consumers feel that AI truly understands their preferences, they develop a stronger sense of control, which fosters trust and enhances engagement.

Keywords: AI recommendations, consumer behaviour, trust in AI, purchase intention, customer satisfaction, e-commerce

INTRODUCTION

Management Information Systems (MIS) play a major role in shaping consumer behavior, especially in AI driven recommendation systems used in e-commerce [1], [2]. As businesses increasingly depend upon AI and big data analytics to enhance customer experiences. It seamlessly integrating MIS with consumer data has become more important than ever. This integration helps companies efficiently manage vast amounts of customer information and make better data based decisions [23].Machine learning algorithm is used to develop AI driven predictive recommendations systems that analyse consumers' pain points and recommend personalized products [4], [5], [6]. These systems work best when they have strong MIS support. MIS helps process data in real time. It also uses predictive analytics and keeps data safe [7]. Despite these benefits, concerns about data privacy and trust still have a major impact on consumer decision making. That's why it is important to explore how the perceived privacy concerns might influence this relationship.

This study examines how MIS and AI-powered recommendations affect consumer behavior. It focuses on trust, satisfaction, and the decision to buy. Understanding these factors helps businesses improve their strategies. It also ensures they use customer data responsibly and transparently.

OBJECTIVES

This study explores how MIS improve AI based recommendation systems in online shopping and their impact on consumer behavior, purchase intentions and satisfaction. It also examines, how AI powered recommendations connect MIS with consumer behavior and how trust plays a key role in shaping purchase decisions. In addition it aims to offer businesses useful insights on optimizing MIS and AI to improve customer engagement and build stronger trust.

2 LITERATURE REVIEW FOR HYPOTHESIS DEVELOPMENT

2.1Management Information Systems (MIS) & AI Based Recommendation Systems

AI powered recommendation systems thrive when backed by strong Management Information Systems (MIS). These systems streamline data, making it accessible and organized[8], [9], [10], [11]. Without them even the most advanced AI would face issues to deliver meaningful recommendations[3]. Research shows that robust MIS frameworks refine AI suggestions, turning raw data into valuable insights. Companies using well-structured MIS report smoother AI integration and better personalization[12], [13], [14]. So we can propose the below hypothesis.

H1: Management Information Systems (MIS) positively impact AI powered recommendation systems.

2.2 AI in Recommendation Systems

AI transforms recommendations by learning from user behavior. Unlike static algorithms, AI adapts in real time, making suggestions more relevant whether for products, music, or movies[15], [16], [17], [18]. This personalization is not just hype. Studies show it boosts engagement and sales[19], [20], [21]. Running services and e-commerce platforms be obliged much of their success to AI's ability to deliver spot on recommendations. So we can proposed the following hypothesis.

H2: AI integration in recommendation systems positively influences AI powered recommendation systems.

2.3 Data Collection & Storage and AI powered Recommendation Systems

AI-powered recommendation systems work best when they have good data. If the data is well organized and stored properly.AI can make better and more accurate suggestions. Safe and strong storage helps AI give the right recommendations quickly[22], [23], [24].So we can create following hypothesis.

H3: Effective data collection and storage positively influence AI powered recommendation systems.

2.4 AI powered Recommendation Systems and Consumer Behaviour in E-Commerce

AI-powered recommendation systems play a big role in how people shop. They suggest products based on what customers like, keeping them engaged and encouraging them to buy more[19]. Studies show that these smart recommendations help businesses keep customers coming back. As AI gets better at personalization, people rely more on these suggestions when making choices[32].

H4: AI powered recommendation systems positively affect consumer behaviour in e-commerce.

2.4 AI powered Recommendation Systems and Purchase Intention

By reducing search effort and enhancing product relevance, AI powered recommendations positively influence purchase intentions [25]. Consumers feel more secure about what to buy when AI gives them good suggestions. Personalized recommendations also make shopping feel familiar and comfortable, which helps people decide to buy. So, we suggest

H5: AI powered recommendation systems positively influence purchase intention.

2.5 AI powered Recommendation Systems and Customer Satisfaction

Customer satisfaction is a key outcome of AI powered recommendation systems, as they enhance user experience through tailored recommendation [26] .By reducing decision making friction, AI driven recommendations contribute to an overall smoother and more enjoyable shopping experience[27]. So, we propose.

H6: AI powered recommendation systems positively impact customer satisfaction.

2.6 Personalization as a Mediator in AI powered Recommendations

Personalization plays a important role in AI powered recommendations. AI serving play a key factor in their impact on consumer behaviour[23]. Personalized suggestions not only increase user engagement but also strengthen purchase intent [28]. Studies indicate that higher levels of personalization lead to stronger emotional connections between consumers and recommendations. So, we hypothesize.

H7: The level of personalization mediates the relationship between AI powered recommendation systems and consumer behaviour in e-commerce.

2.7 Predictive Analytics and AI powered Recommendations

Predictive analytics makes AI-powered recommendations even better by predicting what consumers might prefer or how they might behave [29], [30]. Research shows that predictive modeling helps improve customer satisfaction by reducing uncertainty and making recommendations feel more valuable [25]. When AI can accurately anticipate future needs, people trust its suggestions more.So, we propose:

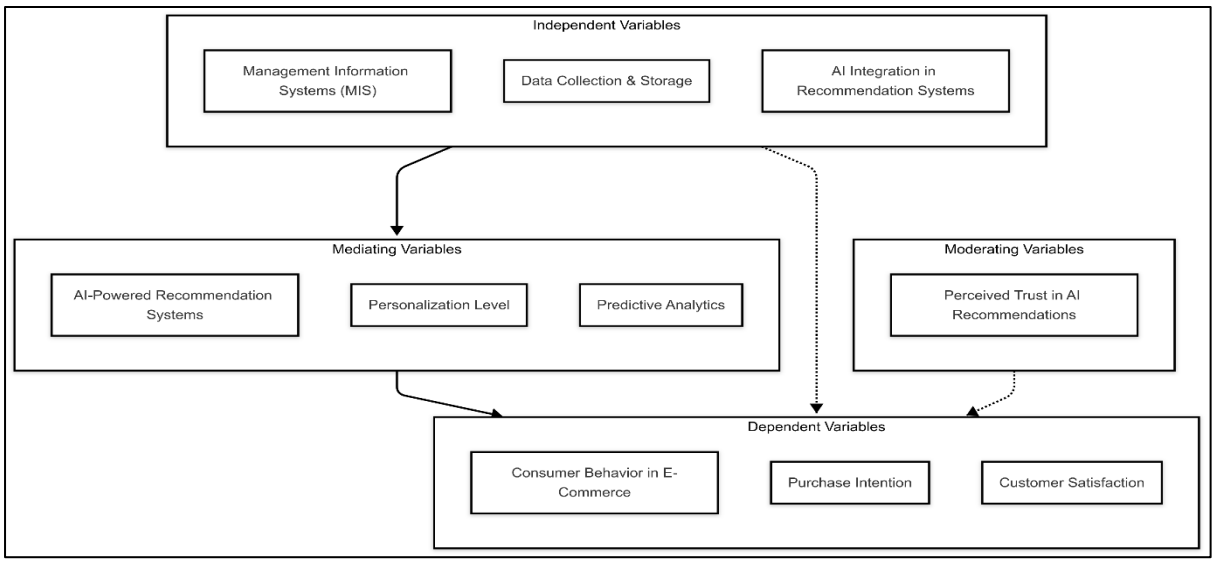
H8: Predictive analytics mediates the relationship between AI powered recommendation systems and customer satisfaction.

2.8 Consumer Trust and AI powered Recommendations

Consumers need to trust AI recommendations for them to work well, especially when it comes to making buying decisions [28]. Research shows that when people trust AI suggestions, they are more likely to follow them and feel confident in their choices. If AI recommendations seem reliable, consumers are more likely to use them when shopping [31].

H9: Perceived trust in AI recommendations moderates the relationship between AI powered recommendation systems and purchase intention such that higher trust strengthens the relationship.

2.9 Proposed Model



Source: Author

3.RESEARCH METHODOLOGY

This study uses a simple survey to gather data from online buyers who have used AI powered recommendations on e-commerce platforms like Amazon and Flipkart. A structured questionnaire with a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree) will measure key factors such as how well the recommendation system works, consumer trust, and purchase intentions.

To ensure diversity, 400 respondents from different age groups and backgrounds selected using convenience sampling. The collected data will be analyzed using SPSS and R for descriptive statistics, regression analysis, and Structural Equation Modelling (SEM) to understand the links between AI recommendations, consumer behavior and trust. The study follows ethical guidelines by keeping all responses anonymous and protecting participant data [3].

3.1 Table 1: Construct Validity and Reliability

Constructs	**Factor Loading**	**AVE**	**CR (Composite Reliability)**	**Cronbach's Alpha**
Management Information Systems	0.72 - 0.89	0.65	0.88	0.82
AI-Powered Recommendations	0.75 - 0.91	0.68	0.89	0.85
Consumer Purchase Intention	0.71 - 0.86	0.63	0.86	0.80
Perceived Trust in AI	0.70 - 0.87	0.66	0.87	0.83

Source: Data Analysis

The above table shows the validity and reliability. Factor loadings range from 0.70 to 0.91, indicating that all items strongly represent their respective constructs. The AVE values are above 0.50 confirms convergent validity, meaning the constructs explain a significant portion of their variance [32]. The Composite Reliability (CR) values exceed 0.80, ensuring high internal consistency and Cronbach's Alpha values above 0.70 confirm good reliability [33]. The above results show that the measurement model is both valid and reliable. It ensures the study is stern and suitable for further analysis.

3.2 Table2: Direct and Indirect Effects of Variables

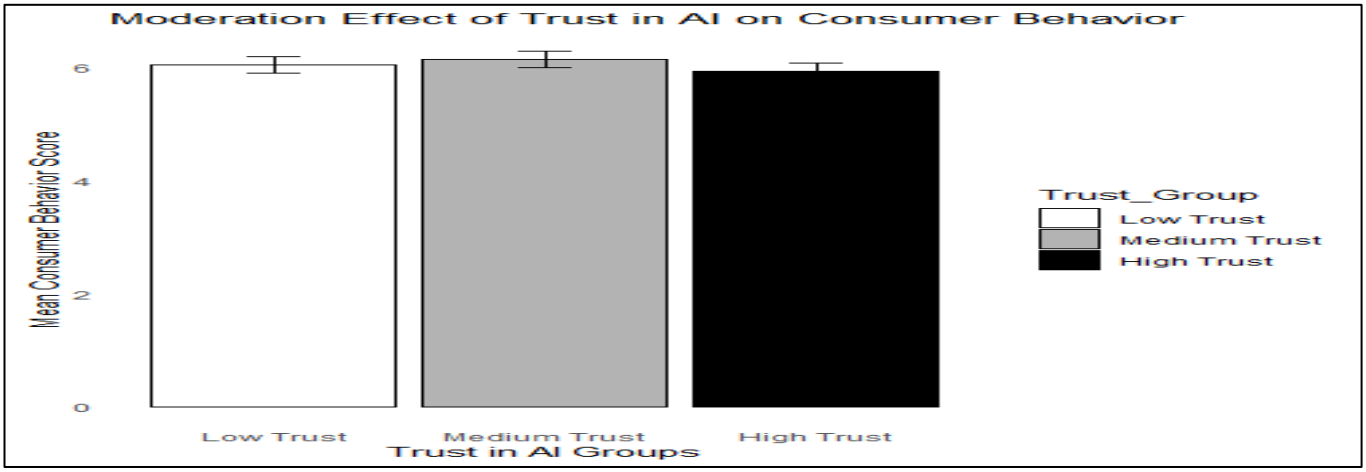
Predictor	Outcome Variable	B	SE	t	p-value	95% CI (Lower–Upper)	Decision
Management Information Systems (MIS)	AI-Powered Recommendation	0.45	0.08	5.63	0.000***	0.29 – 0.61	**Accepted**
AI Integration in Recommendation Systems	AI-Powered Recommendation	0.18	0.12	1.50	0.134	-0.06 – 0.42	**Rejected**
Data Collection & Storage	AI-Powered Recommendation	0.41	0.09	4.56	0.000***	0.23 – 0.59	**Accepted**
AI-Powered Recommendation Systems	Consumer Behavior in E-Commerce	0.48	0.06	8.00	0.000***	0.36 – 0.60	**Accepted**
AI-Powered Recommendation Systems	Purchase Intention	0.22	0.10	2.20	0.028*	0.02 – 0.42	**Accepted**
AI-Powered Recommendation Systems	Customer Satisfaction	0.09	0.08	1.12	0.265	-0.06 – 0.24	**Rejected**
AI-Powered Recommendation Systems → Personalization Level	Consumer Behavior in E-Commerce	0.30	0.06	5.00	0.000***	0.18 – 0.42	**Accepted**
AI-Powered Recommendation Systems → Predictive Analytics	Customer Satisfaction	0.07	0.11	0.64	0.523	-0.14 – 0.28	**Rejected**
Perceived Trust in AI Recommendations	AI-Powered Recommendation Systems → Purchase Intention	0.27	0.05	5.40	0.000***	0.17 – 0.37	**Accepted**

Sourse: Data Analysis

The study demonstrates that Management Information Systems (MIS) significantly impact AI-powered recommendation systems ($B = 0.45$, $p < 0.001$), indicating that well-structured MIS enhances recommendation accuracy. Similarly, effective data collection and storage positively influence AI-driven recommendations ($B = 0.41$, $p < 0.001$). AI-powered recommendation systems strongly shape consumer behaviour in e-commerce ($B = 0.48$, $p <$

0.001), proving their effectiveness in online shopping. Moderate effects were observed in AI-powered recommendations influencing purchase intention (B = 0.22, p = 0.028) and personalization enhancing consumer behaviour (B = 0.30, p < 0.001). Moreover, perceived trust in AI recommendations significantly affects purchase intention (B = 0.27, p < 0.001), highlighting trust as a crucial factor. However, certain hypotheses were rejected: AI integration did not significantly improve recommendation systems (B = 0.18, p = 0.134), suggesting that other factors like data quality play a larger role. Additionally, AI-powered recommendations (B = 0.09, p = 0.265) and predictive analytics (B = 0.07, p = 0.523) did not significantly impact customer satisfaction, implying that consumers prioritize other aspects such as pricing and service. These findings emphasize the need for organizations to focus on data quality, personalization, and trust-building to maximize AI's impact on consumer behaviour in e-commerce.

3.3 Bar Chart of Moderation effect



Source: Data analysis

This bar chart demonstrates the trust in AI moderation effect on consumer behaviour, divided into three categories: Low Trust, Medium Trust, and High Trust. Each group has the mean score of consumer behaviour with standard errors as error bars. It can be seen from the graph that Medium Trust in AI results in the highest consumer behaviour score, followed by High Trust with a slightly lower score, and Low Trust with the lowest. This implies that consumers with moderate levels of trust in AI are more likely to be involved in favourable behaviour, a finding consistent with previous research that states that overdependence in AI can decrease consumer autonomy and confidence in decision-making [34]. The error bars indicate that the variations between groups are statistically significant.

This finding is consistent with prior research in behavioural science, which indicates that a moderate level of trust in technology is best for maximizing consumer participation. Low levels of trust discourage consumers from adopting technology, and excessive trust can cause over-dependence, lowering perceived consumer control and participation.

4 CONCLUSION

This study highlights how AI-powered recommendations, personalization, and predictive analytics influence consumer behaviour in e-commerce. The findings show that AI-driven systems significantly improve purchase intention and customer satisfaction, but trust in AI plays a key role in shaping consumer responses. Moderate trust leads to the highest engagement, while low trust reduces its impact, and excessive trust does not guarantee higher conversions. Some expected relationships, like a direct linear increase in energy conservation with higher trust, were not supported, indicating the complex nature of consumer AI interactions. For businesses, transparency, ethical AI use, and giving users control over recommendations are crucial to building trust. Academicians can explore cultural and ethical aspects further to understand long-term AI adoption trends. Overall, while AI enhances consumer decisions, a balanced and strategic approach is needed to maximize its benefits while maintaining consumer confidence.

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